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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/607,219	06/30/2000	Atsushi Kanda	15.18/5053	8200
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24033 7590 03/31/2003

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EXAMINER

QUACH, TUAN N

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 03/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicant(s) N .

Applicant(s)

09/607,219

KANDA, ATSUSHI

Examiner

Art Unit

Tuan Quach

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 February 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 48,49 and 52-74 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 48,49 and 52-74 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

For convenience, "et al." is omitted, e.g., Chen for Chen et al.

Claims 48, 49, 52-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over ~~taken with~~ Bach taken with Chen and Hall.

Bach teaches forming dielectric layers 18 and 20 of oxide and nitride on metal line 16/17, forming photoresist 24 thereon, etching the dielectric layers to form tapered openings. The use of fluorine compound such as CF_4 or SF_6 as etchant and the inclusion of oxygen are also taught wherein such oxygen addition serves to control the tapered shape. See column 4 line 61 to column 5 line 23, column 7 line 1-3, column 8 lines 11-67. Bach does not recite the identical language of pad.

Chen teaches pad 16, passivation 20 comprising silicon oxide 20A and silicon nitride 20B, forming photoresist mask 22, dry etching the passivation 20 to the pad 16, including isotropic etching and anisotropic etching to prevent erosion of photoresist to prevent penetration and attach of passivation over wiring lines. The use of fluorine containing etchant and fluorocarbon etchant is also taught. See the abstract, Fig. 4, column 3 line 40 to column 5 line 32.

Hall also teaches the provision of pad 22 interconnect 24 from interconnecting layer 12, which is formed from the interconnect layer followed by passivation layer 42

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including oxide 422 and nitride layer 424 and the etching therethrough using dry etching including the use of suitable fluorine containing materials carbon tetrafluoride. The use of carbon tetrafluoride and oxygen is also taught. See column 2 line 7 to column 3 line 27.

It would have been obvious to one skilled in practicing Bach to have employed the metal line to be the aluminum pad since such corresponds to conventional language and structure for such aluminum structure as pad as evidenced by Chen or Hall wherein such pad application and opening thereto can be obtained. The use of isotropic etching would have been obvious and advantageous as taught by Chen wherein penetration and attack of the passivation over the wiring lines can be obviated. It would have been obvious and would have been within the purview of one skilled in the art to have employed the desired profiles including a desired angle the upper layer and a more steeping angle for the lower layer if desired as evidenced in Chen, to have optimized the appropriate distance to improve device packing. Conversely, although Chen recites NF_3 as etchant of the nitride, the use of CF_4 as alternative fluorine containing materials would have been obvious to one skilled in the art as evidenced by Hall, column 3 lines 18-23, including its oxygen inclusion as delineated in Hall, column 2 line 66 and in Bach as delineated above evidencing the interchangeability of such fluorine containing sources including the use of oxygen. It would have been conventional and obvious to have effected continuous etching given the teachings delineated above wherein no discontinuation is required or so that such discontinuation may be minimized. The completion of the connection including the provision of a bump electrode including a

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barrier on the exposed bonding pad is well known in the art and thus would have been obvious.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Quach whose telephone number is 703-308-1096. The examiner can normally be reached on M - F from 9 to 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Wael Fahmy can be reached on (703) 308-4918. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318 (Before Final) and (703) 872-9319 (After Final).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



Tuan Quach
Primary Examiner